Attachment 2

UPPER BLACKSTONE WPAD SELF-MONITORING FORM

Permit # 431

Description of Sample Location: Wastewater Treatment Effluent

For each sample provide all of the following information for each regulated pollutant:

Date the Sample was Taken: 08 / 23 / 07

Flow in gallons/day: 45,553

Sample Matrix: (check one) Wastewater: X **Other:**

Pollutant	Conc.	Unit	MDL	Method of Analysis	Date Analyzed	Name of Analyst	Grab or Composite	Preserved With	Name of Sampler	Time Sample Taken
Silver	BDL	mg/L	.001	200.7	08/29/07	EK	8 hr.comp.	HNO_3	P.L'Esperance	7:...
Cadmium	BDL	"	.001	200.7	"	EK	"	"	"	"
Chromium	0.169	"	.001	200.7	"	EK	"	"	"	"
Copper	0.016	"	.001	200.7	"	EK	"	"	"	"
Nickel	0.074	"	.001	200.7	"	EK	"	"	"	"
Lead	BDL	"	.001	S3113B	08/28/07	RS	"	"	"	"
Zinc	0.134	"	.002	200.7	08/29/07	EK	"	"	"	"

MDL - Method Detection Limit
Conc. - Concentration of Pollutant

NOTE: Chain of Custody Forms must be submitted all laboratory ...

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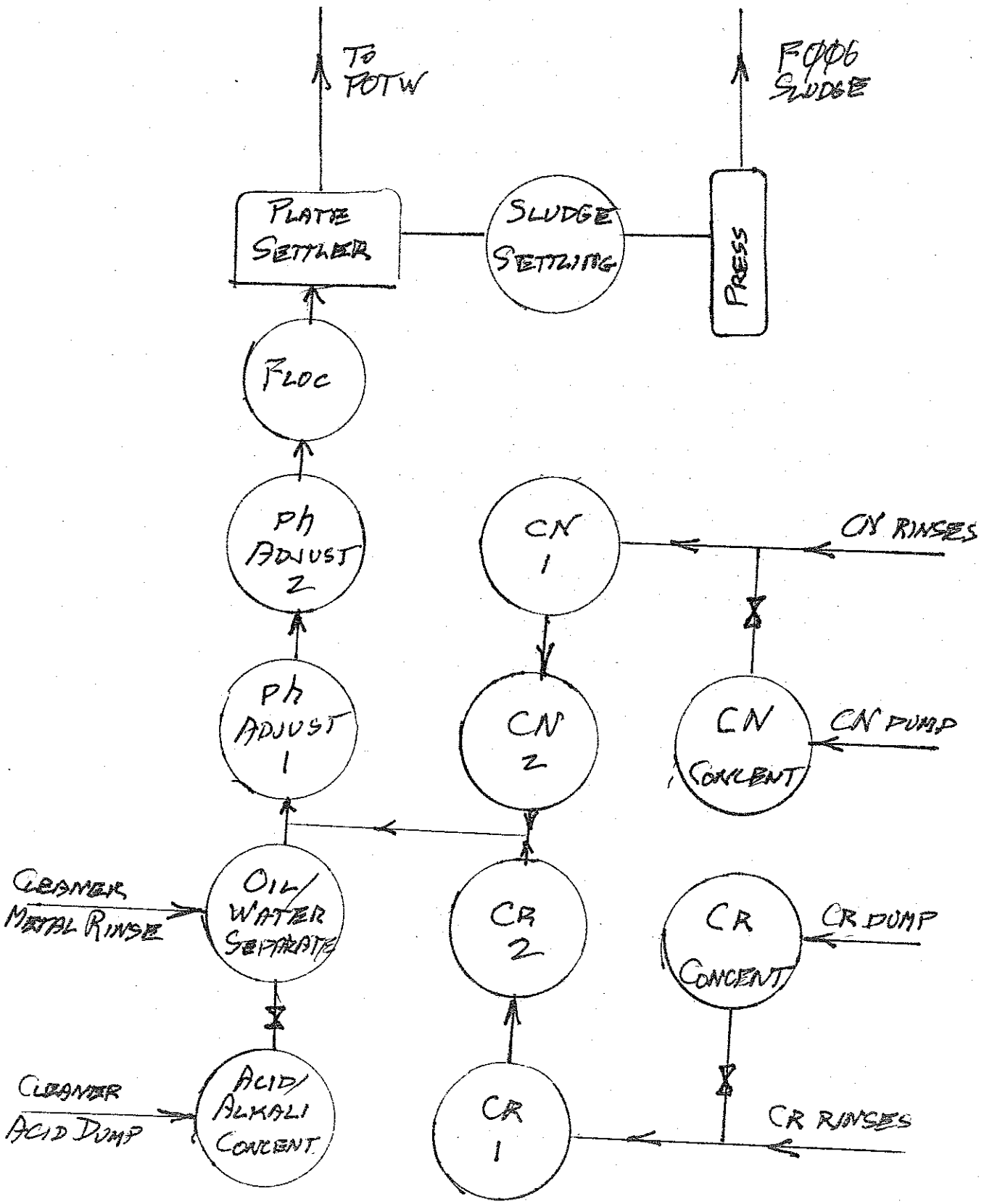
Pollutant	Conc.	Unit	MDL	Method of Analysis	Date Analyzed	Name of Analyst	Grab or Composite	Preserved With	Name of Sampler	Time Sam Tak
Total Cyanide	BDL	Mg/L	0.01	335.3	09/01/07	E/G	Grab	NaOH	P. L. Esperance	7A 4P

MDL - Method Detection Limit
Conc. - Concentration of Pollutant

NOTE: Chain of Custody Forms must be



WASTE TREATMENT FLOW DIAGRAM

INDEPENDENT PLATING

III.

DESCRIPTION OF WATEWATER TREATMENT SYSTEM

Introduction

The WWT system at Independent Plating Co. handles the wastewaters generated by its plating operations. It is designed to treat rinsewaters on a continuous flow-through basis with provisions for treating batch dumps of concentrated plating wastewaters.

All tank discharges in the plating area are segregated according to type of waste:

1.) Chrome bearing rinses which require hexavalent chromium reduction prior to alkaline precipitation.

2.) Cyanide bearing rinses which require alkaline chlorination prior to alkaline precipitation.

3.) Acid/alkali rinses which include acid pickle, cleaner, zinc plating and nickel plating rinses and require no pretreatment prior to alkaline precipitation.

The main control panel is an epoxy coated NEMA 12 steel unit holding the final pH recorder, indicators, switches, lights and controls for the entire system. A graphic display of the WWT process is also included for operational convenience. An audible alarm will activate when the system is not functioning properly. An alarm silence switch quiets the audible alarm but lights a red "alarm silenced" lamp. After the alarm condition is corrected, the switch must be returned to normal mode.

The entire WWT system is broken down into the following processes:

A) Chrome Rinse Treatment
B) Cyanide Rinse Treatment
C) Acid/Alkali Treatment
D) pH system/Alkaline Precipitation
E) Solids Removal - Flocculation and Sedimentation
F) Dewatering System
G) Batch Treatment System

A) Chrome Rinse Treatment

The chrome rinse system is designed to reduce hexavalent chromium Cr(+6) to trivalent chromium Cr(+3) which can then be precipitated out of solution in the alkaline precipitation stage of treatment. The reduction process is referred to as

acid sulfonation. The reaction is accomplished by the addition of acid to shorten reaction time and the addition of sodium bisulfite as the reducing agent.

Equipment

The chrome rinse system consists of one (1) 250 gallon rinse collection sump equipped with dual vertical sump pumps, a float type level sensing device, two (2) 2000 gallon reaction tanks equipped with agitation, a pH probe and an ORP probe.

Also included is a sodium bisulfite feed station consisting of one (1) 250 gallon day tank with agitation and a Wilden M-1 diaphragm transfer pump.

An acid feed station consists of one (1) 4500 gallon holding tank and a LMI metering transfer pump. The system is also equipped with one (1) 1000 gallon chrome concentrate holding tank.

System Operation

Chromium bearing rinses flow by gravity into the yellow 250 gallon chrome rinse collection sump located in the collection pit. Float type level controls actuate the verticlal sump pump. In the event of a pump malfunction, a high level alarm condition will actuate the standby pump into operation. The rinsewater is pumped to Chrome Reaction tank #1, referred to as CR#1, a 2000 gallon tank equipped with a mixer, a pH probe and an ORP probe. The pH and ORP of the rinsewater in CR#1 are continuously monitored by the pH and ORP probes and pH and ORP reactors located in the main control panel. The reactors are preset with the desired high and low level set-points.

Method of Treatment

The treatment of chromium is a two step process.

The first step takes place in CR#1 where Cr(+6) is reduced to Cr(+3). This reaction takes place while the pH is kept at 2.5 or less and the ORP is kept below 300 mV. The operator can visually observe the completion of the reaction by the change in color of the solution from yellow to blue.

The second step, precipitation occurs at pH adjustment when the trivalent chromium becomes insoluble at a pH of 8.5 - 10.0. This takes place in the pH system which will be described later.

B) Cyanide Treatment System

The cyanide treatment system is designed to facilitate the destruction of the

carbon-nitrogen bond of the cyanide molecule thereby rendering it non-toxic. This treatment is a two stage process known as alkaline chlorination. By regulating the pH to an alkaline condition and adding sodium hypochlorite (12% bleach) as the oxidizing agent, the toxic waste is converted first to cyanate and then, in the second stage, to carbon dioxide, nitrogen and water.

Equipment

The cyanide treatment system consists of a rinse collection sump tank equipped with dual vertical sump pumps and a float-type level sensing device. Also, there are two (2) 2000 gallon reaction tanks, CN1 and CN2, equipped with mixers. Original design had each tank with pH and ORP control, but with the drastic decrease in the amount of cyanide rinsewaters only one tank, CN1, is equipped with pH and ORP probes and reactors. The hypochlorite delivery system consists of an LMI pump mounted on a 55 gallon drum of sodium hypochlorite.

A 1600 gallon cyanide concentrate holding tank is available for holding concentrated cyanide dumps.

System Operation

The cyanide bearing rinses are static rinses as opposed to the dynamic rinses of other plating processes. Because of the minimal rinsing needed for cyanide related plating processes, a continuous flow through system was not practical. The original system was designed to treat heavy loading in cyanide bearing rinses due to the use of a 15,000 gallon cyanide zinc plating line. With the advent of alkaline zinc plating, introduced at Independent Plating in the early 1990's, the reduction in rinsewaters bearing cyanide warranted a modification in treatment methods.

Instead of continuous flow, the static rinses of cyanide plating are pumped periodically to CN1 for two stage destruction by alkaline chlorination. These treated waters are then pumped to pH system for precipitation of metals.

Instead of a 4000 gallon holding tank for sodium hypochlorite, a 55 gallon drum is purchased to prevent the unnecessary waste of chemicals (sodium hypochlorite has a shelf-life and looses potency with age). As a result of these modifications, cyanide destruction is carried out in a batch type manner as follows.

Step I of Cyanide Destruction

1.) Cyanide rinses are pumped to CN1 reaction tank and agitation is started.

2.) ORP and pH probes are emersed in the solution.

3.) Sodium hydroxide is pumped to the tank to raise pH to 10.5.

4.) ORP reactor will call for the addition of sodium hypochlorite until a reading of 400 mV occurs. The ORP reaction is completed at this point.

NOTE: During the addition of sodium hypochlorite, care is given to maintain the pH above 10 but no higher than 10.5.

At this point in the treatment, cyanide has been converted to the less toxic cyanate by the reaction: NaCN + NaOCl (+ pH 10.5) ==> NaCNO + NaCl.

Step II of Cyanide Destruction

1.) After the first stage is accomplished and 400 mV has been maintained for one (1) hour, the pH is lowered slowly to 8.5 - 9.0 using dilute hydrochloric acid.

2.) Sodium hypochlorite is added to the CN1 tank until the ORP reads +600 mV. This reading indicates that the destruction is completed and cyanate is converted to carbon dioxide and nitrogen by the reaction: 2 NaCNO + 3 NaOCl ==> 2 CO2 +N2+ 3 NaCl + 2 NaO.

3.) Allow mixing for one (1) hour to maintain 600 mV and pH 8.5 - 9.0.

4.) Dip Potassium Iodide Test strip into treated solution. The white strip should turn black indicating a residual chlorine Cl2. A residual chlorine indicates complete destruction.

The treated solution is now transferred to the pH system, pH#1 reaction tank for precipitation and solids removal.

C) Acid/Alkali Treatment

The acid/alkali rinsewaters include rinses from acid pickling, alkaline cleaners, alkaline zinc plating and nickel plating processes. These rinses require no pretreatment like chrome or cyanide and are therefore pumped from the sump collection area via the same style vertical sump pumps as cyanide and chrome rinsewaters.

The acid/alkali rinsewaters are pumped to a 2000 gallon equalization tank and flow directly from there in the pH system for pH adjustment and solids removal.

D) The pH System

The pH adjustment system maintains the pH of the effluent at the optimum pH value for effective solids removal. In the case of Independent Plating Co. that optimum value is between 9.0 and 9.5 pH. By the addition of sodium hydroxide, the metals: chromium, nickel, copper, lead and zinc, become insoluble and

precipitated out of solution forming a slurry of suspended solids.

Equipment

The pH adjusting system consists of two (2) 2000 gallon reaction tanks, each equipped with a pH probe and reactor (found in Main Control Panel). Also, each of the tanks, pH#1 and pH#2 has its own mixer. A sodium hydroxide delivery system consists of one (1) 250 day tank and two (2) LMI metering pumps.

E) Solids Removal

The solids removal system separates the metal hydroxide and other suspended solids from the water. The additon of a polyelectrolyte enhances the conglomeration and settling of the suspended matter. The solids removal system consists of a flash mixer, flocculator, inclined gravity plate settler and polyelectrolyte (polymer) feed station. Two (2) M-2 Wilden settler pumps are used to pump settled sludge to the sludge holding tanks.

The discharge from the pH adjustment system flows to the flash mixer chamber. Here a diluted anionic polymer is injected by a LMI chemical metering pump and quickly dispensed by a high speed mixer to enhance complete contact with the suspended solids.

Following the flash mix chamber is a flocculator where a variable speed "picket fence" mixer slowly stirs the wastewater to form a floc. The flocced wastewater then enters the gravity plate settler where the solids are separated from the up-flowing water. The solids settle in a dual cone hopper where they are pumped by M-2 settler pumps to the sludge holding tanks. The frequency of pumping depends on solids loading of the wastewater.

F) Dewatering System

The dewatering system further separates the solids and water for economical hauling of the solid material, currently classified as waste metal hydroxide sludge. (The handling and disposal of this sludge is addressed in Section V of this manual.) This separation is accomplished by thickening and filtration. The system consists of three (3) sludge thickening tanks, a filter press and a filter press pump.

Sludge settling in the plate settler's dual hoppers is pumped, by the Wilden M-2 settler pumps, to one of three (3) sludge thickening tanks. These sludge tanks are primarily holding tanks, but the increased settling time facilitates additional thickening. The decant for the thickening tanks is returned to the acid/alkali sump where it is re-introduced into the pH system.

The filter press pump, a Wilden M-8 diaphragm pump, pumps sludge from the thickening tank through the JWI plate and frame filter press. This plate and frame filter presses is a common type of filter used to dewater industrial sludges. It consists of an assembly of plates, between which are two layers of filter cloth. Sludge is pumped into the space between the two cloths by means of a central passageway. The plate faces are grooved to allow the filtrate to drain out of the drainage ports. The filtrate flows by gravity to the acid/alkali sump in the pit and is returned to the pH system.

The filter press pump typically starts out at 40 psi and increases in increments of 20 psi until it reaches a maximum pressure of 80 - 100 psi. Therefore the plates are held in poisition using a frame and hydraulic cylinder.

When the filter cloths are filled with dewatered sludge (typically 25 - 30% dewatered) the supply pump is shut off, the pressure released and the hydraulic cylinder is retracted. The plates are then opened one at a time and the filter cake removed by hand and emptied into a hopper below the filter press. The capacity of the hopper is two (2) press loads, after which it is emptied into a 25 yard roll-off for hazardous waste storage until scheduling for pick up by a licensed hauler and delivery to a licensed TSDF is arranged.

More information about management of sludge can be found in Section V of this manual.

The cloths of the filter press tend to become blinded after weeks of use and are therefore occasionally cleaned with a power sprayer. Details concerning filter press operation can be found in Maintenance, Section IX, of this manual.

G) Batch Treatment System

Batch treatment of Independent Plating's concentrated wastes takes place in the cyanide rinse treatment tanks, CN1 and CN2. Because cyanide batch treatment only takes place on an infrequent basis, the tanks are available and convenient for treatment of spent concentrated wastes. Such wastes considered for batch treatment are: zinc plating solution, nickel plating solution, electropolish solution , cleaners and pickling acids.

The use of batch treatment enables the continuous flow-through rinse system to function without introducing concentrates that would:

1.) Overtax the capacity of the systems solids removal.

2.) Compromise the quality of the systems effluent.

After batch treatment, the wastewaters are pumped to sludge removal system

and the filtrate, being rendered manageable, is introduced into the pH adjustment system.